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Sosso et al.

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(54) **SALAD PUSHER**

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USPC 211/59.2, 59.3, 51, 88.02, 88.01, 211/126.15, 126.16, 126.5, 132.1, 133.3; 312/60, 61, 71, 72, 73; 221/226, 279, 221/304
See application file for complete search history.

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(57) **ABSTRACT**

A pusher tray assembly comprises a hanging tray and a sliding tray having a wire track, the sliding tray moveably connected to the hanging tray by fins of a pusher, the pusher slidingly engaged to the wire track for movement between a first position and a second position.

16 Claims, 13 Drawing Sheets

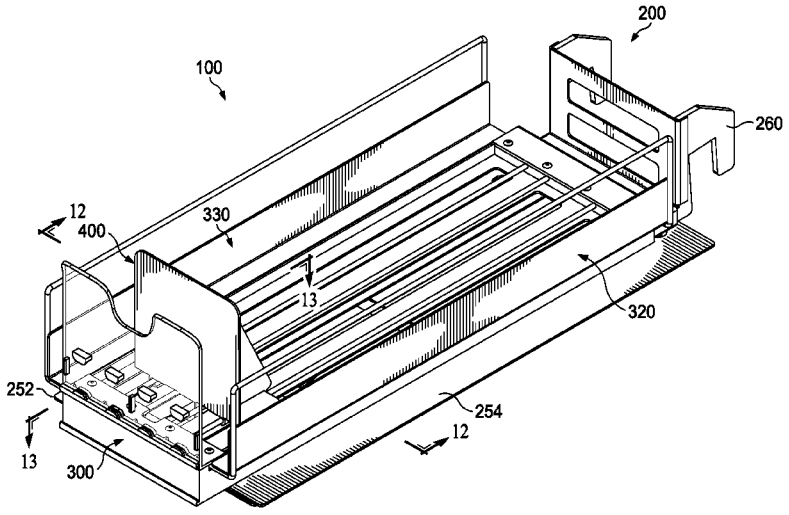

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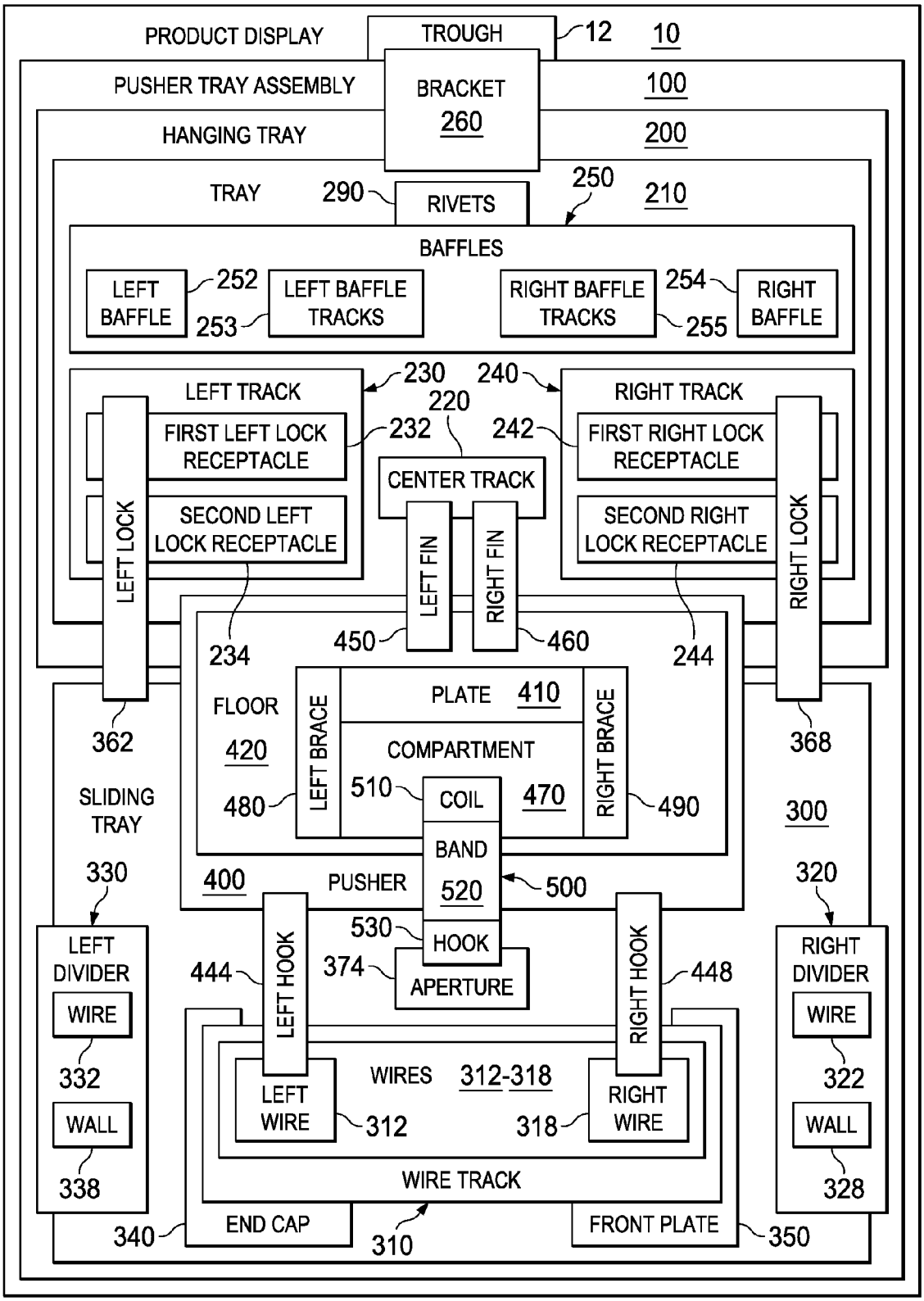
FIG. 1


PRODUCT DISPLAY
TROUGH
12
10
PUSHER TRAY ASSEMBLY
BRACKET
260
100
HANGING TRAY
200
TRAY
290
RIVETS
250
210
BAFFLES
LEFT BAFFLE
252
253
LEFT BAFFLE TRACKS
RIGHT BAFFLE TRACKS
254
255
RIGHT BAFFLE
LEFT TRACK
230
240
220
RIGHT TRACK
FIRST LEFT LOCK RECEPTACLE
232
242
FIRST RIGHT LOCK RECEPTACLE
CENTER TRACK
SECOND LEFT LOCK RECEPTACLE
SECOND RIGHT LOCK RECEPTACLE
LEFT LOCK
LEFT FIN
RIGHT FIN
RIGHT LOCK
234
450
460
244
362
368
FLOOR
420
PLATE
410
COMPARTMENT
LEFT BRACE
RIGHT BRACE
480
510
COIL
470
490
SLIDING TRAY
300
BAND
520
400
PUSHER
500
330
320
530
HOOK
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444
LEFT HOOK
374
APERTURE
RIGHT HOOK
448
RIGHT DIVIDER
WIRE
332
WIRES
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338
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WIRE TRACK
340
END CAP
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FRONT PLATE
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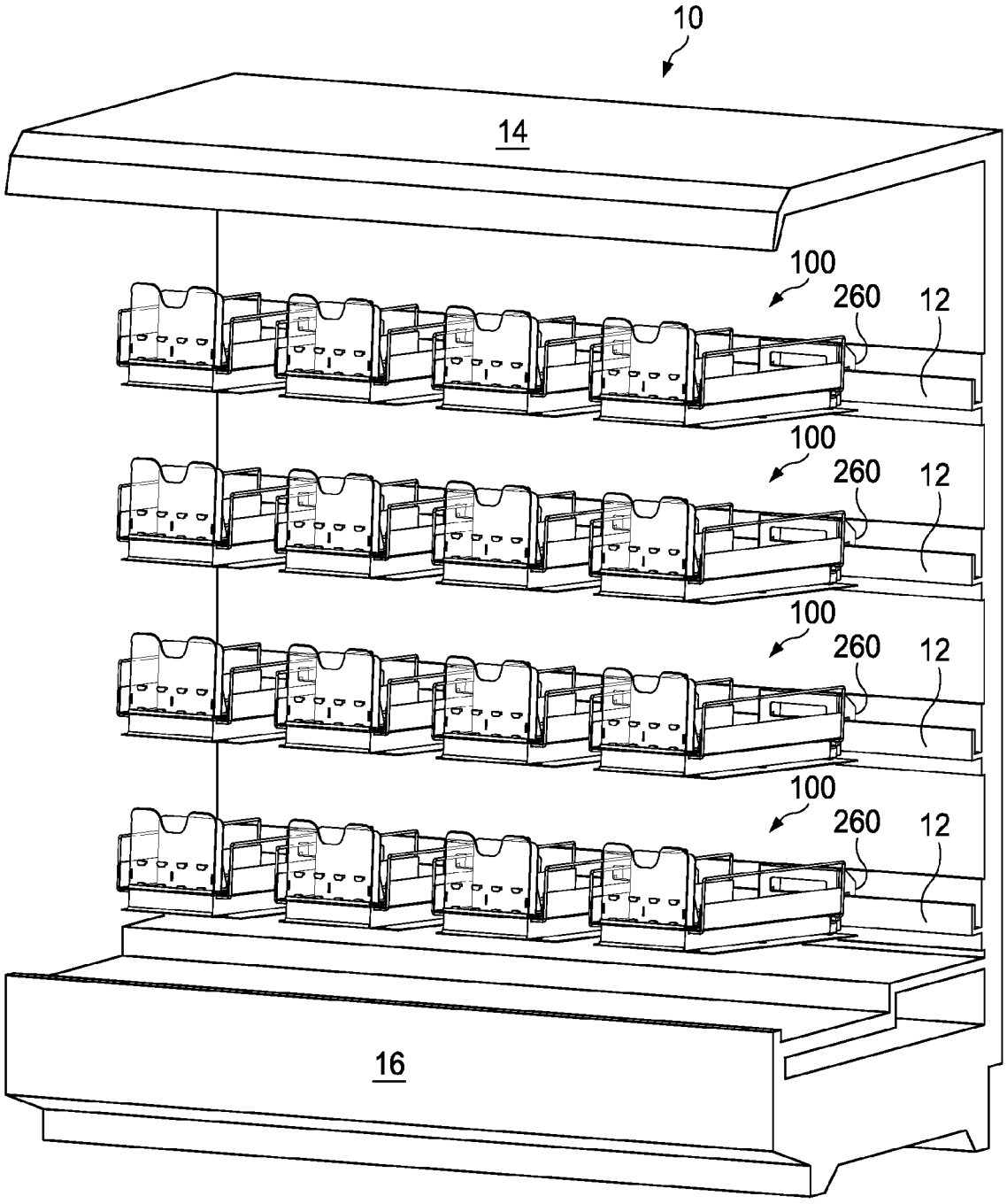

FIG. 2

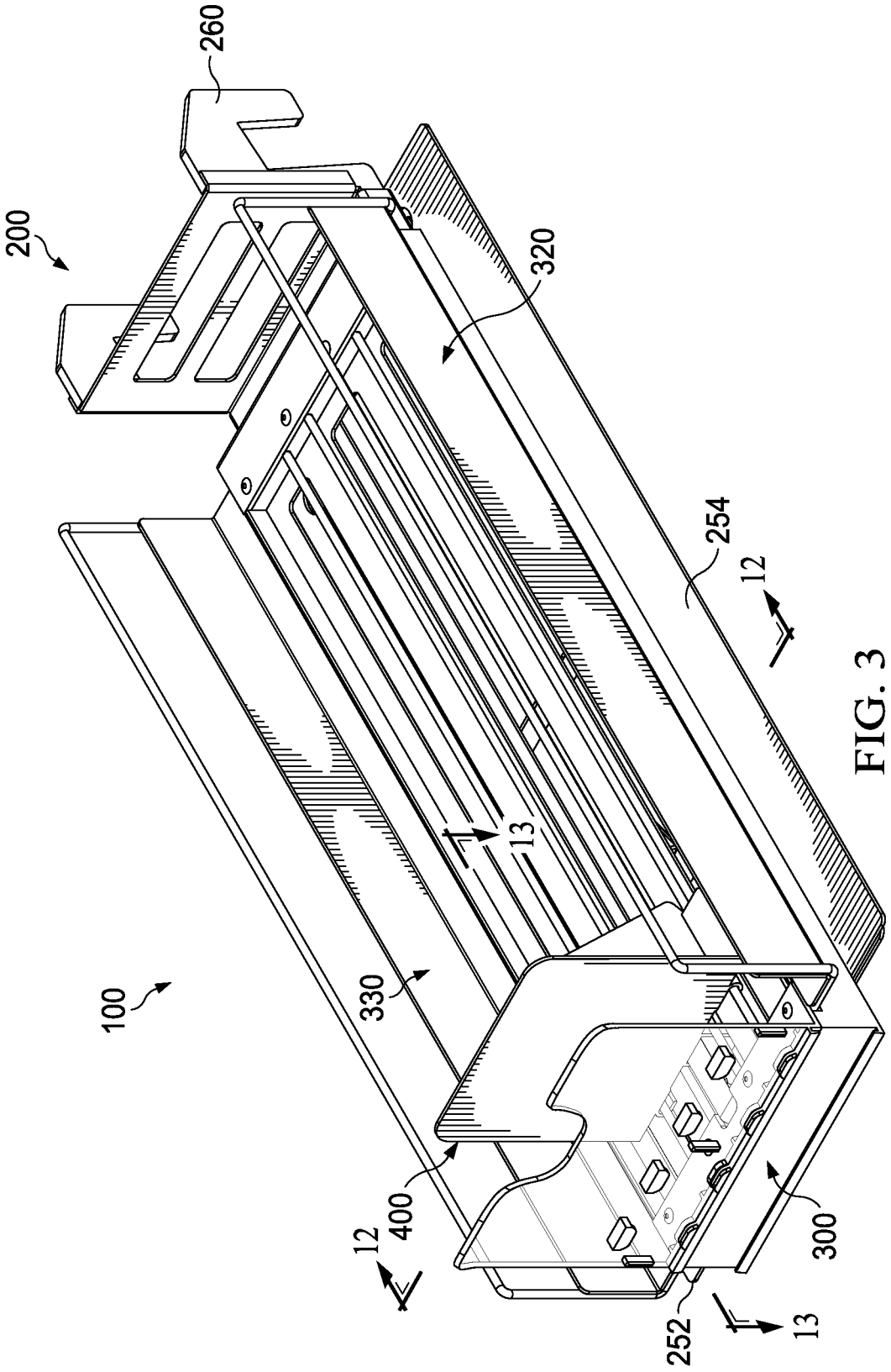

FIG. 3

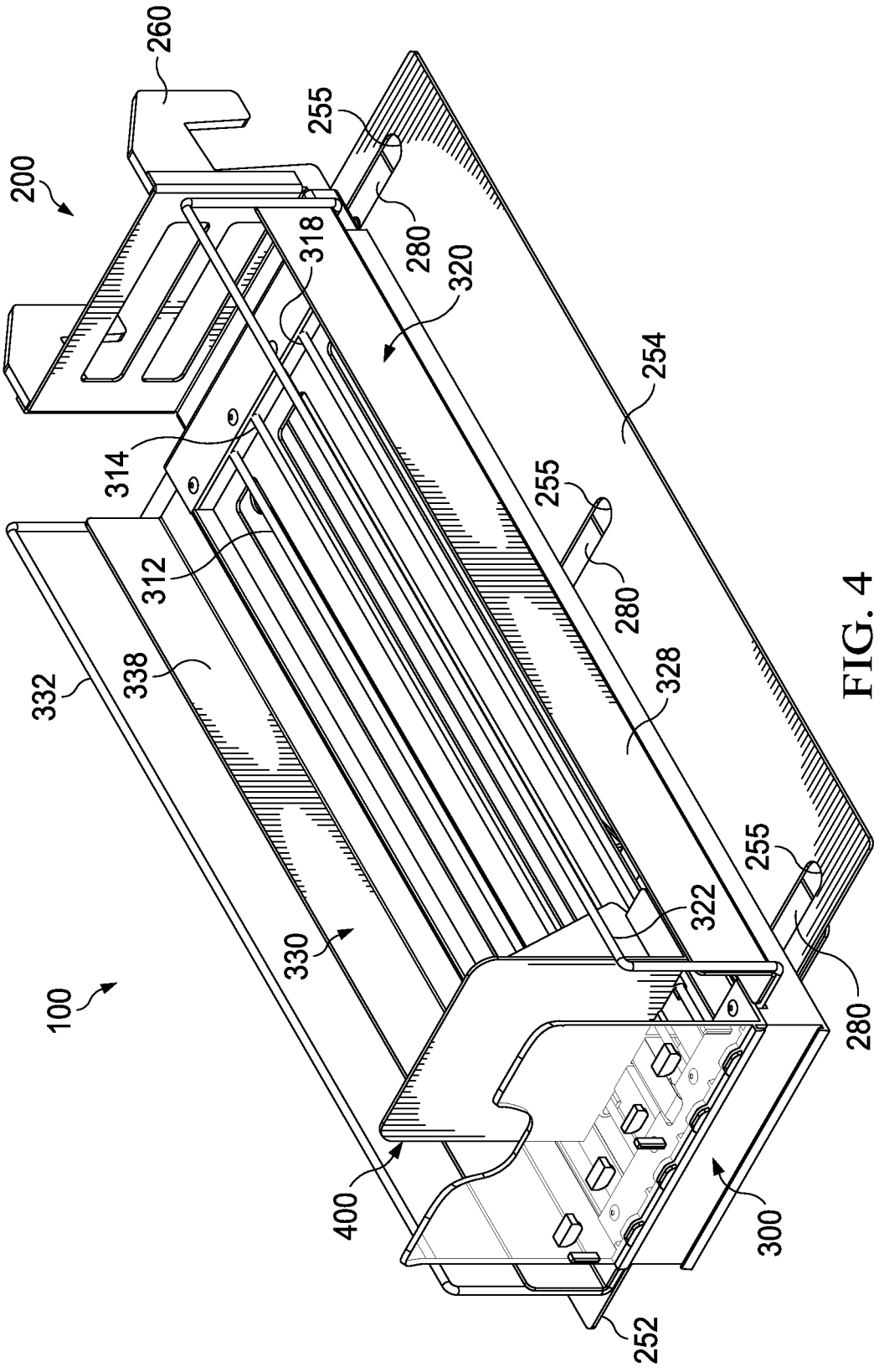
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FIG. 4

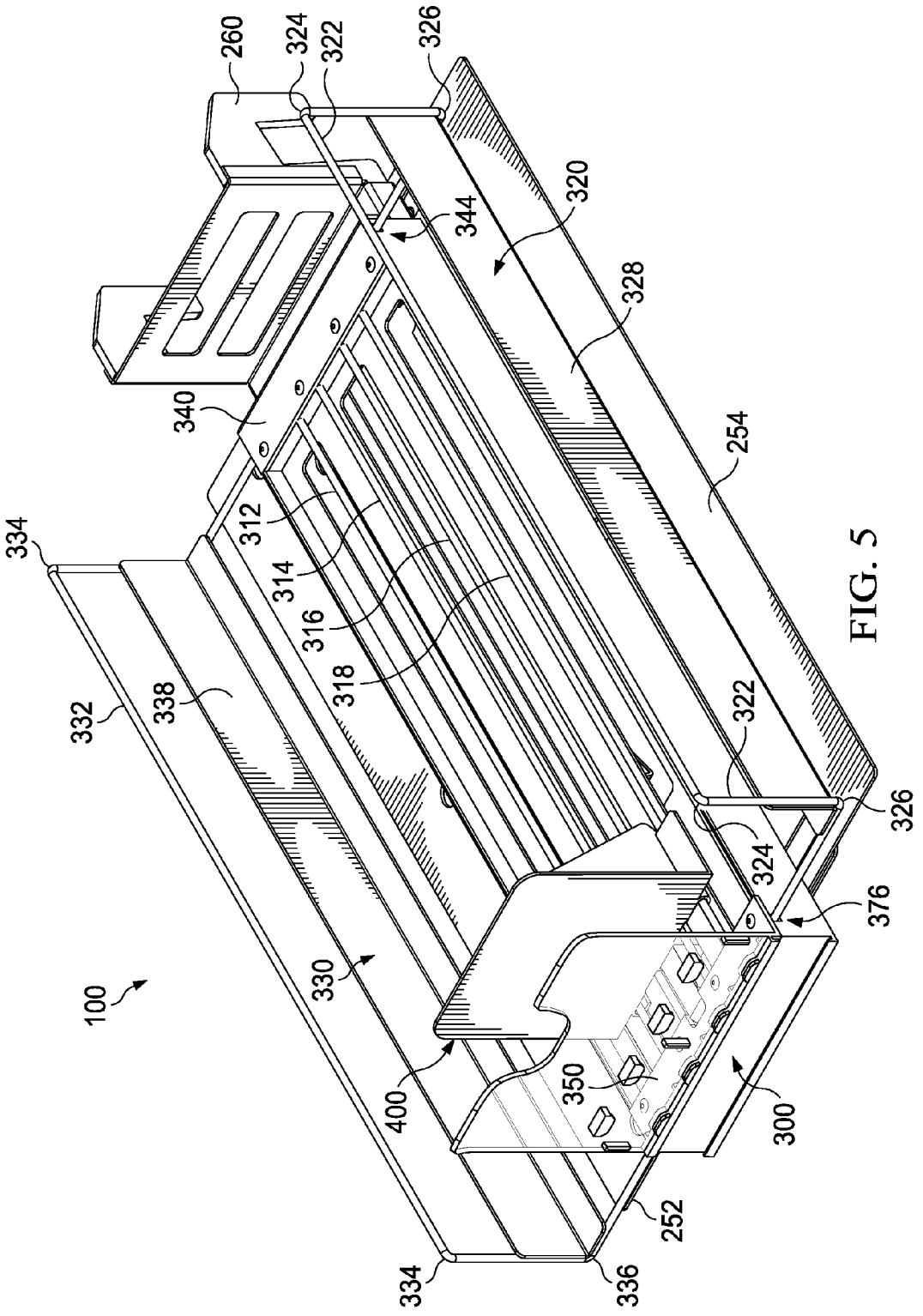
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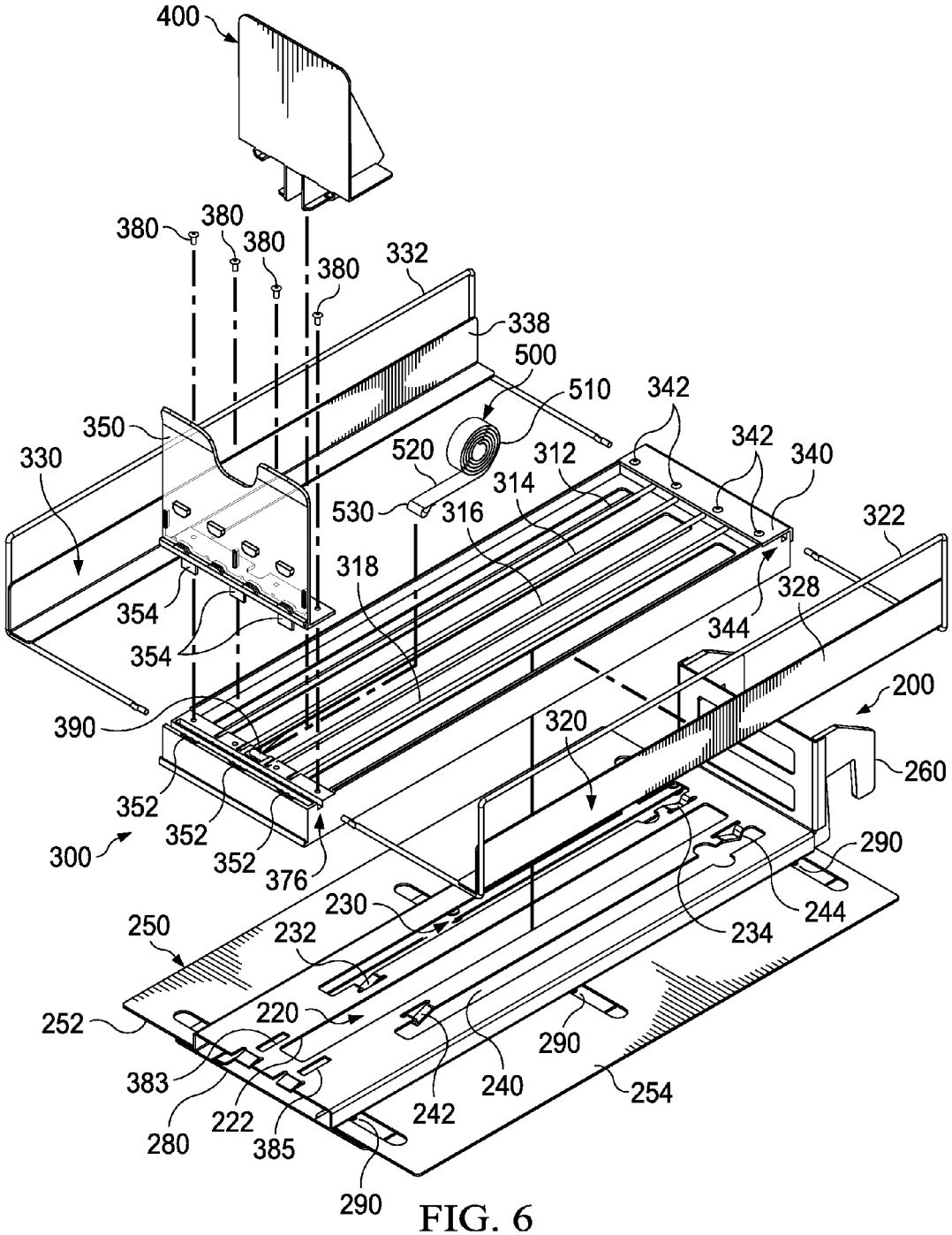
FIG. 5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354
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352
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352
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FIG. 6

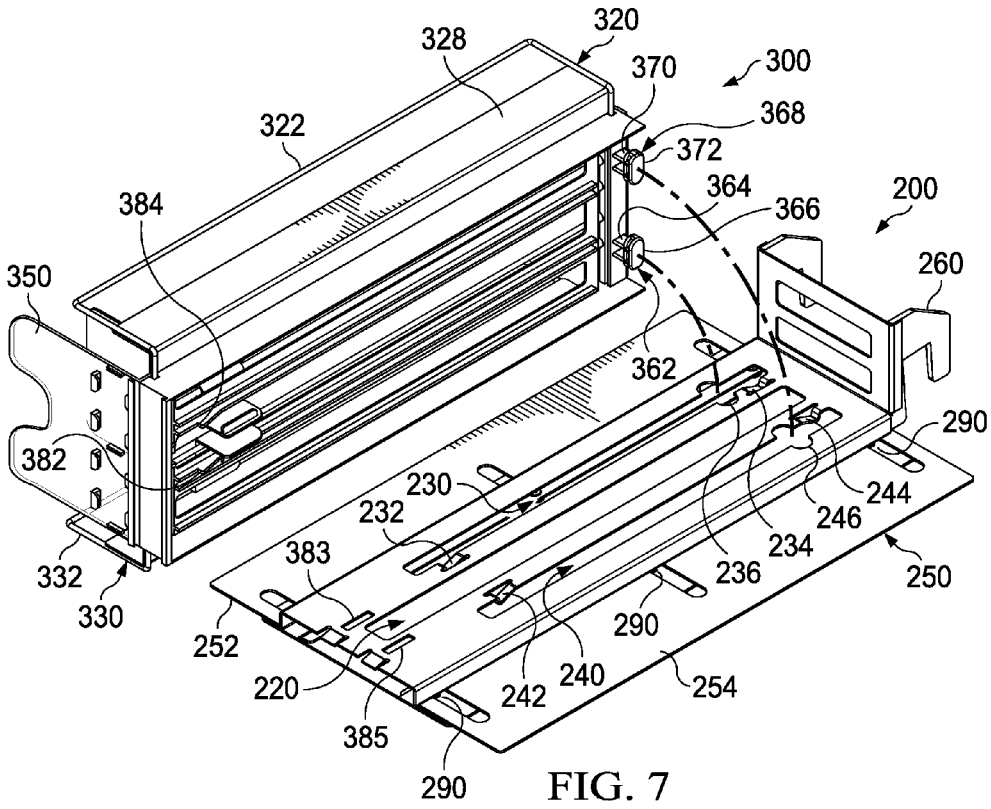
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FIG. 7

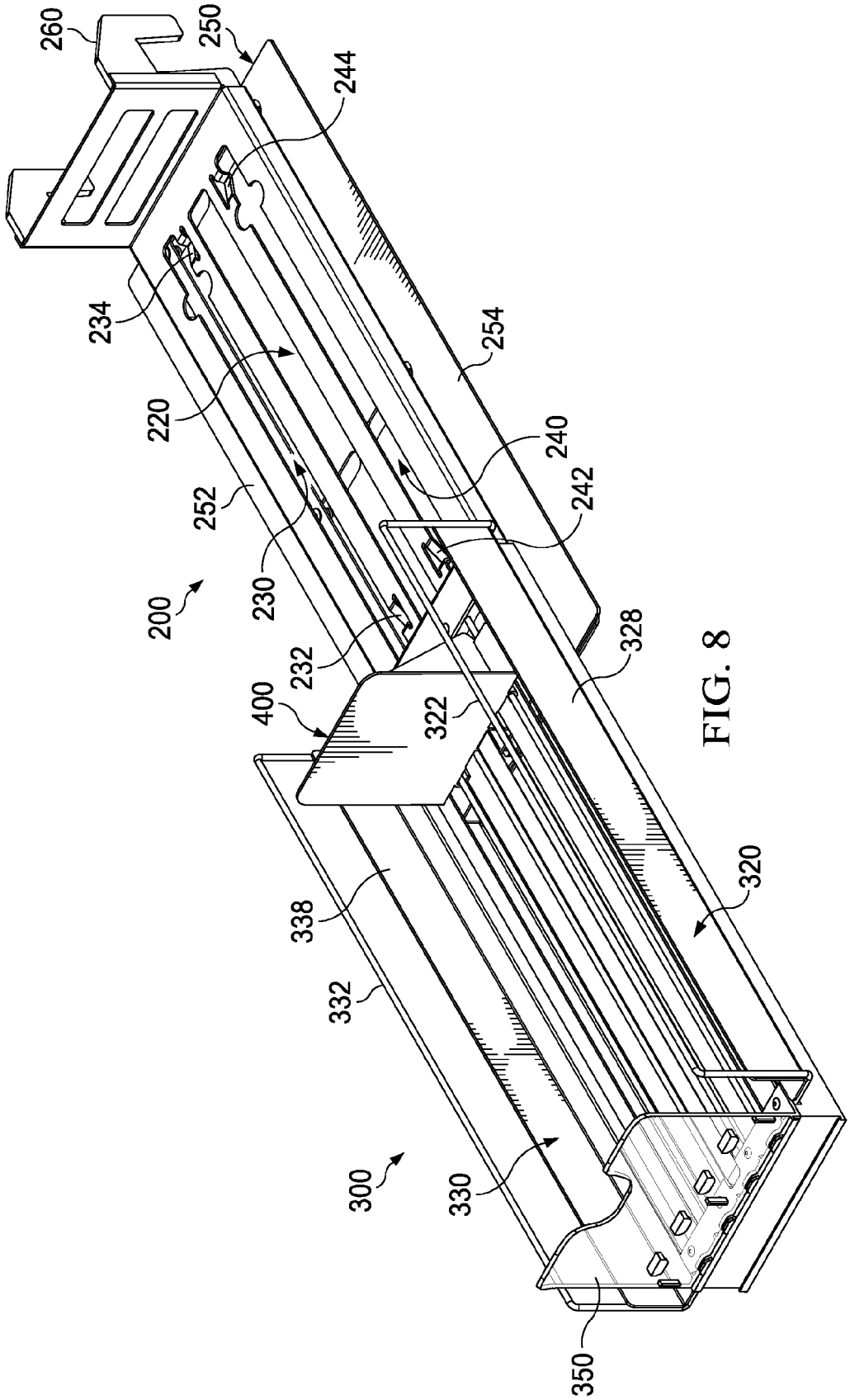
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FIG. 8

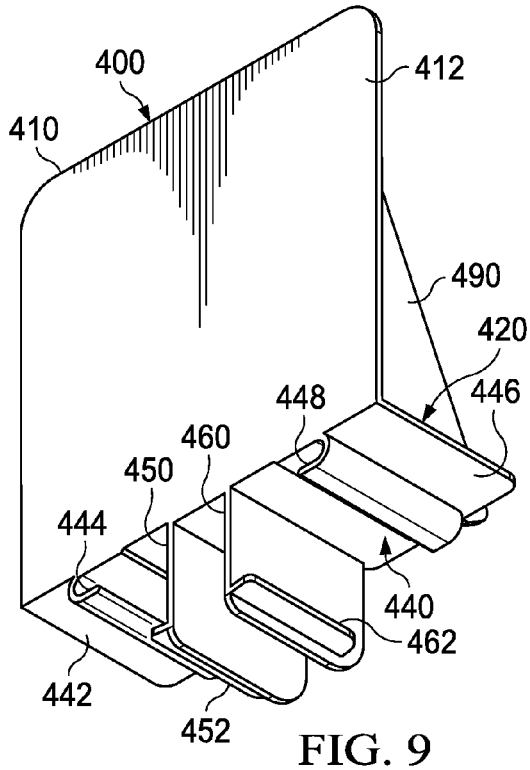

FIG. 9

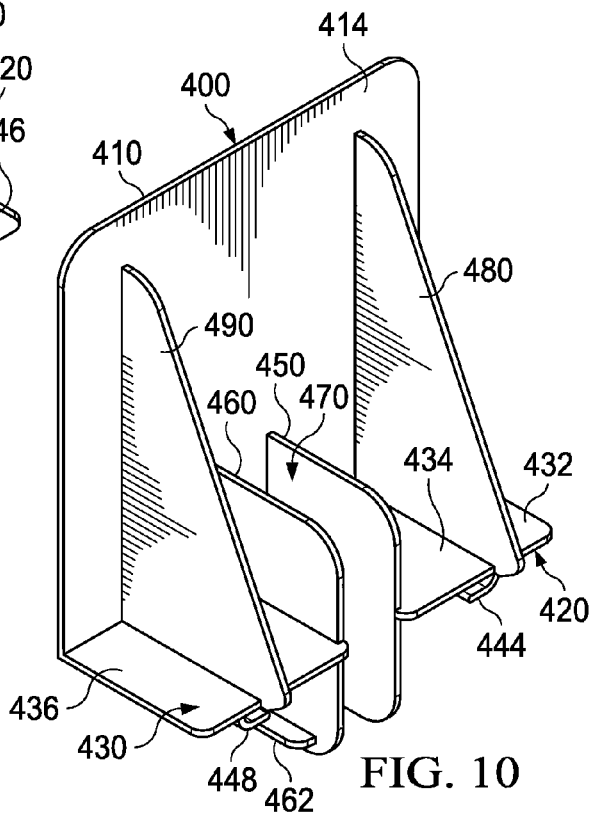

FIG. 10

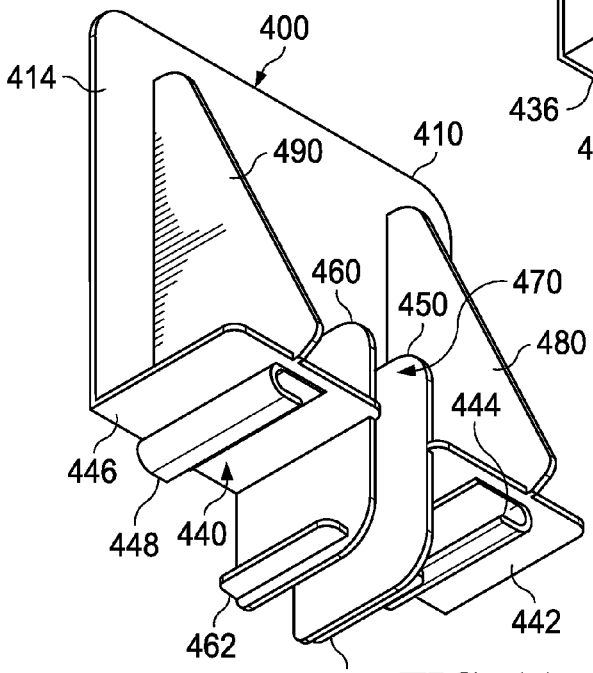

FIG. 11

FIG. 12

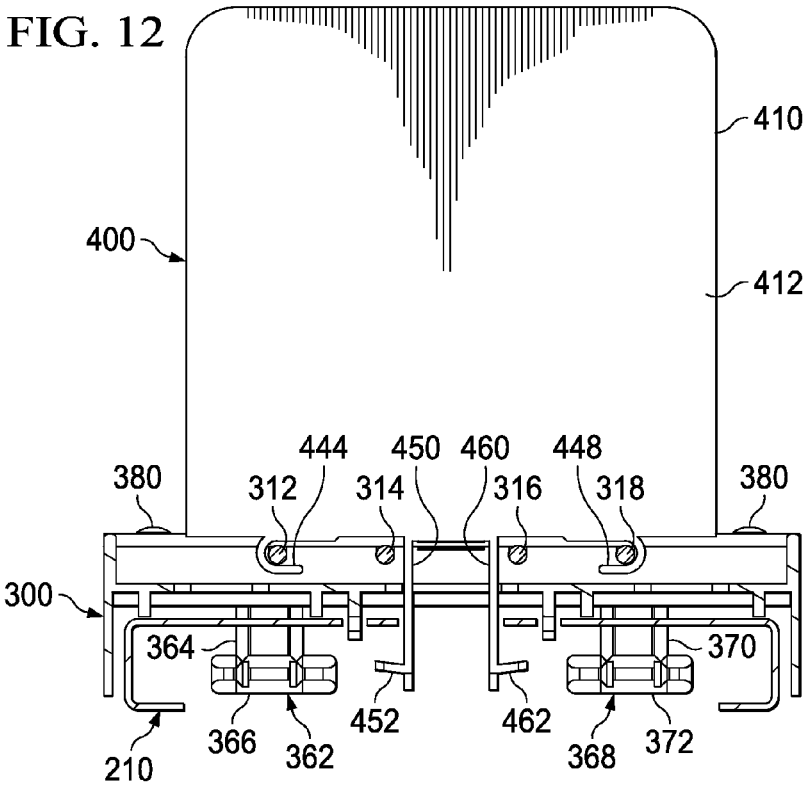
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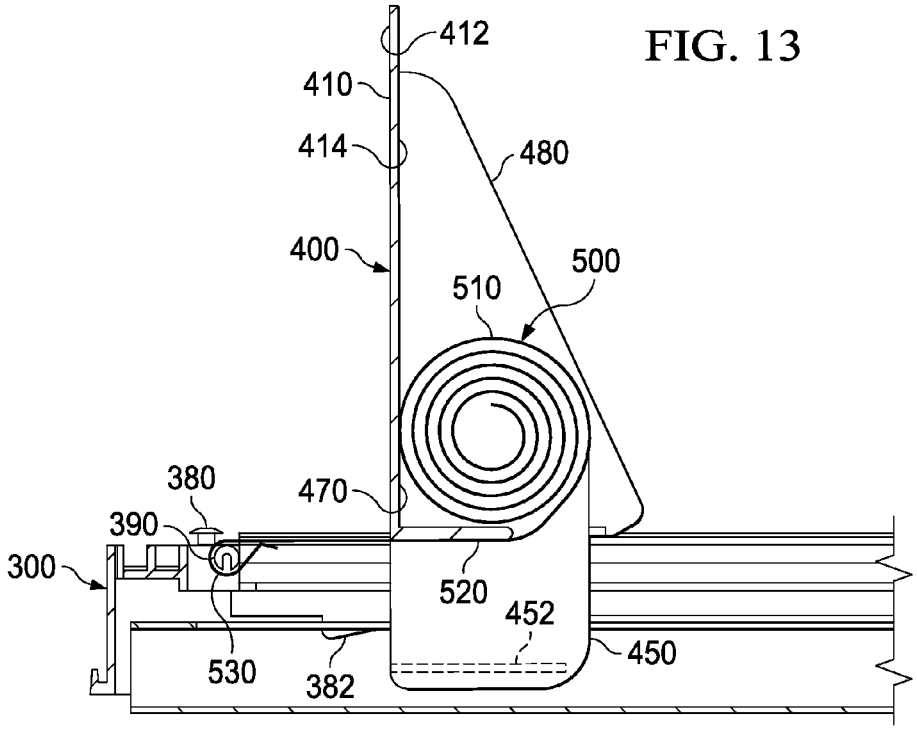
FIG. 13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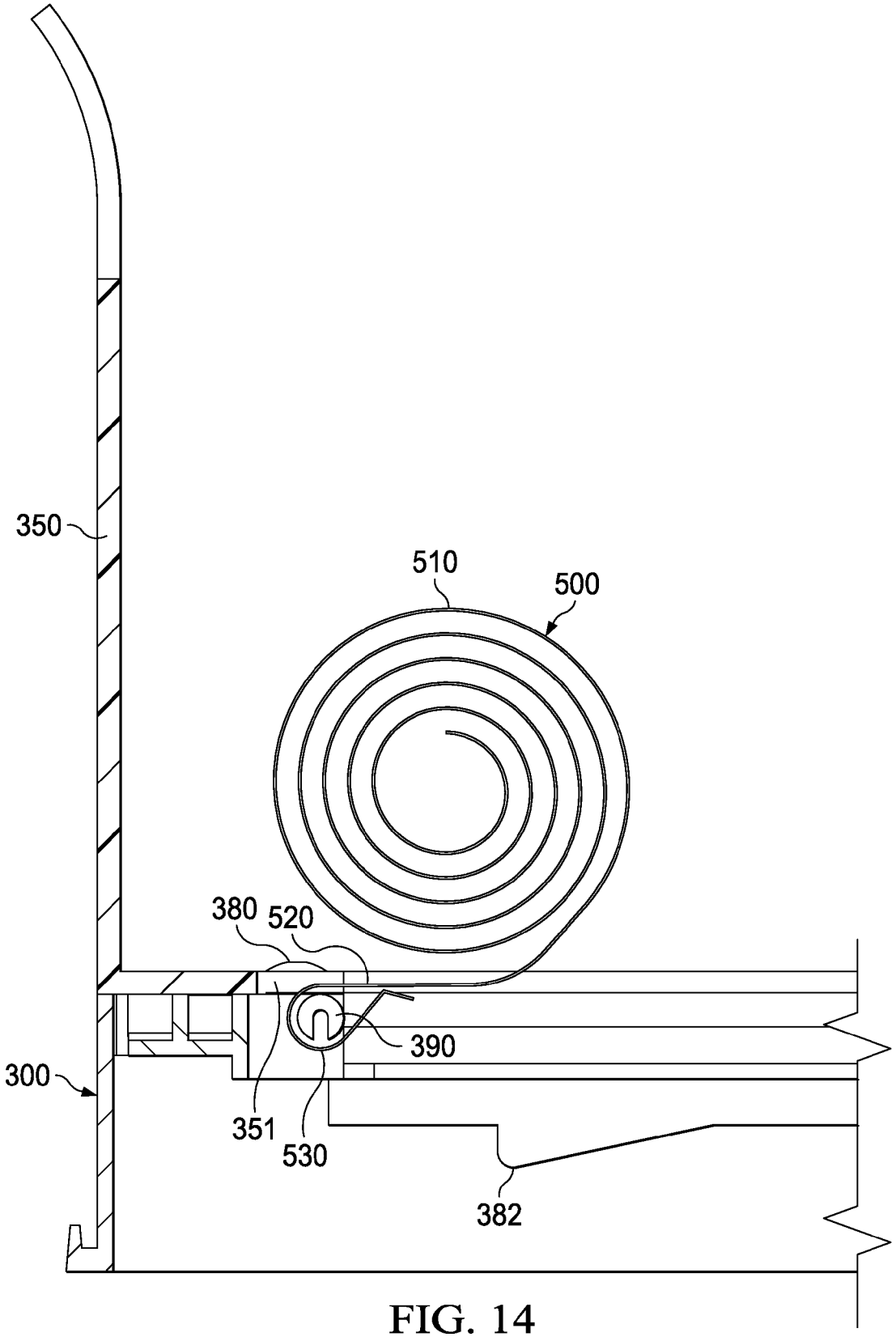

FIG. 14

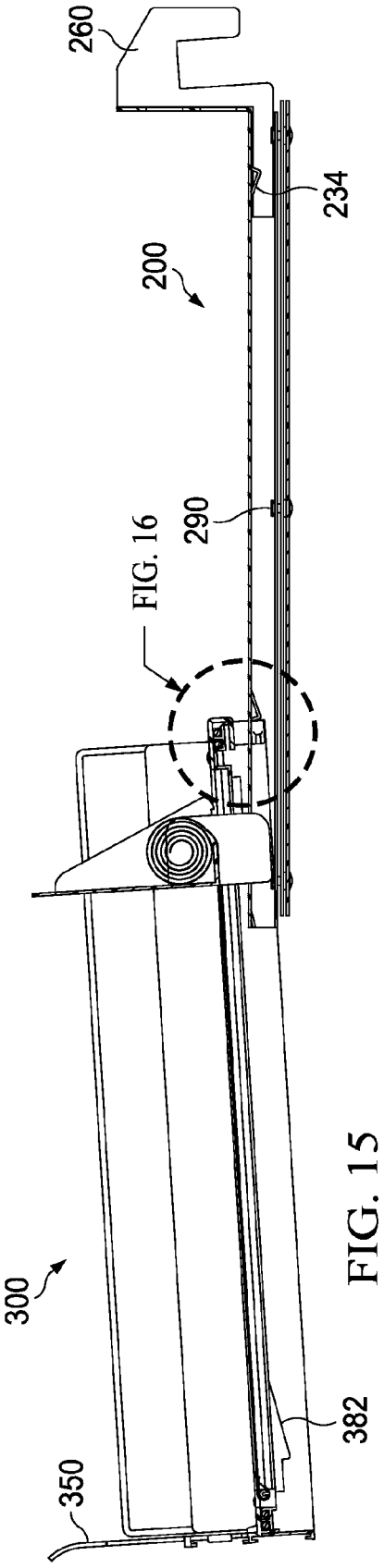

FIG. 15

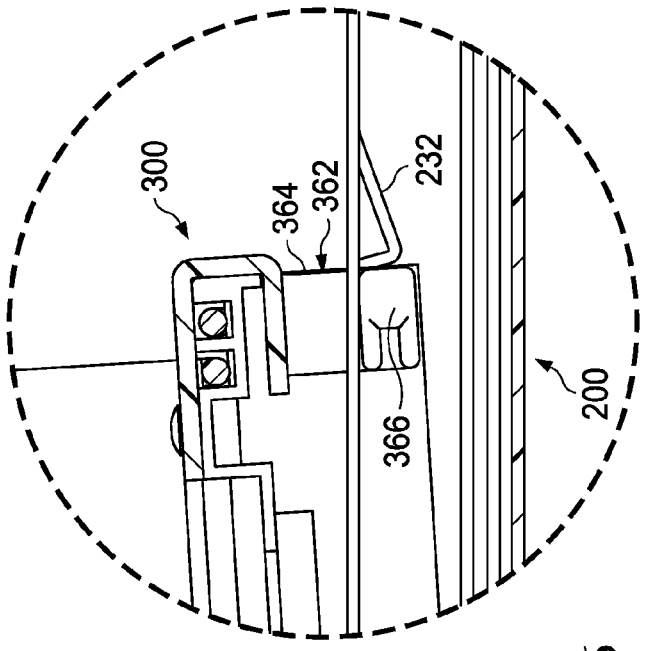

FIG. 16

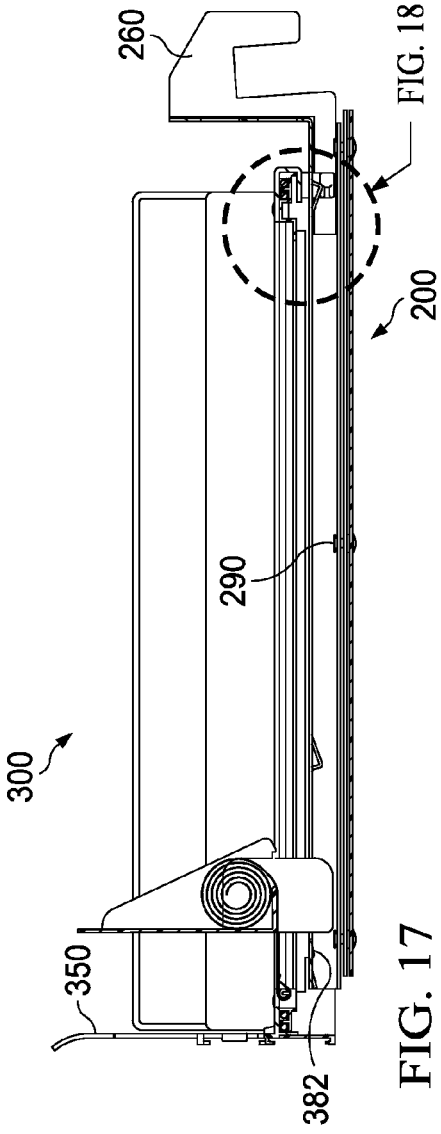

FIG. 17

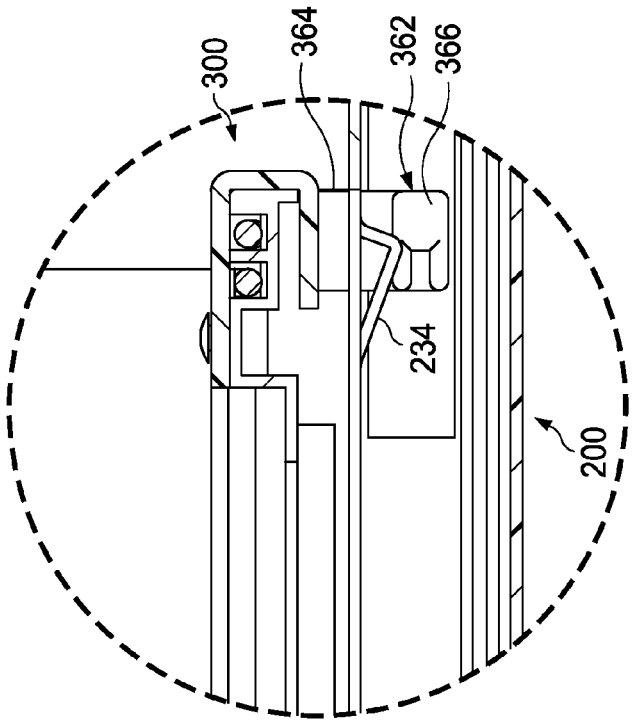

FIG. 18

SALAD PUSHER

BACKGROUND INFORMATION

1. Field

The present disclosure relates generally to product display, and in particular to product display shelves having a spring driven pusher to force product to the front of the display.

2. Background

In retail stores, shelves are necessary for displaying and storing products. When a product is removed from a tray, a gap remains on the tray where the product was stored. Trays that automatically push the product forward are desirable so that a customer is always presented with a product and therefore, does not assume that the product is out of stock, or alternatively have to search for the product.

A number of different types of devices are known for automatically pushing product forward. For example, gravity fed rollers allow certain products to advance so that a product is always present at the front of the display. Another example is a spring driven pusher plate where the spring driven plate advances toward the front of the display as product positioned between the pusher plate and the front of the display is removed.

Although spring driven pusher plates are known, a number of problems arise in the implementation of current spring driven pusher plates. One problem is that springs may break or lose their force and need to be replaced. Replacement of springs may require disassembly of a tray unit in which the pusher plate operates. Another problem with spring driven pusher plates is that the pusher plate must be held to the rear while placing product between the pusher plate and the front of the display. Furthermore, packaged food products may require refrigeration. Cold air sinks to the bottom of a space. Therefore, refrigeration of a display area may be impaired during loading of the trays as removed trays allow cold air to settle to the bottom of the display. Additionally, trays may need to be adjustable to accept products of different widths, and adjusting a tray may cause gaps in levels of the product display that impair refrigeration.

Accordingly, it would be advantageous to have a method and apparatus, which takes into account one or more of the issues discussed above as well as possibly other issues.

SUMMARY

In one illustrative embodiment, a pusher tray assembly comprises a hanging tray and a sliding tray having a wire track, the sliding tray moveably connected to the hanging tray by fins of a pusher, the pusher slidingly engaged to the wire track for movement between a first position and a second position.

In another illustrative embodiment, a pusher tray assembly comprises a hanging tray, a wire track in a sliding tray, the wire track having a plurality of wires, each wire having a first end removably engaged to a front end of the sliding tray and a second end removably engaged to a rear end of the sliding tray. A pusher slidingly engages the sliding tray and the hanging tray for movement between a rear of the sliding tray and a front of the sliding tray and for sliding engagement of the sliding tray to the hanging tray. A left hook extends from a bottom of the pusher and slidingly engages a first wire in the wire track. A right hook extends from the bottom of the pusher and slidingly engages a second wire in the wire track. A left fin extending downward from a bottom of the pusher slidingly engages a center tray track in the hanging tray. A right fin extending downward from the bottom of the pusher slidingly engages the center tray track in the hanging tray. A front plate removably engaged to the front end of the sliding tray secures first ends of wires to the sliding tray. An end cap removably engaged to the rear end of the sliding tray secures second ends of wires to the sliding tray.

In another illustrative embodiment, a method of constructing a pusher tray assembly comprises securing a sliding try to a hanging tray by engaging hooks on a pusher with wires on the sliding tray and by slidingly engaging fins on the pusher with a center track on the hanging tray so that flanges on the fins prevent separation of the sliding tray from the hanging tray.

BRIEF DESCRIPTION OF THE DRAWINGS

The novel features believed characteristic of the illustrative embodiments are set forth in the appended claims. The illustrative embodiments, however, as well as a preferred mode of use, further objectives and advantages thereof, will best be understood by reference to the following detailed description of an illustrative embodiment of the present disclosure when read in conjunction with the accompanying drawings, wherein:

FIG. **1** is an illustration of a block diagram of a pusher tray assembly in accordance with an illustrative embodiment;

FIG. **2** is an illustration of a product display in accordance with an illustrative embodiment;

FIG. **3** is an illustration of a pusher tray assembly in accordance with an illustrative embodiment;

FIG. **4** is an illustration of the pusher tray assembly in accordance with an illustrative embodiment;

FIG. **5** is an illustration of the pusher tray assembly in accordance with an illustrative embodiment;

FIG. **6** is an illustration of an exploded view of the pusher tray assembly in accordance with an illustrative embodiment;

FIG. **7** is an illustration of an exploded view depicting engagement of the sliding tray with the hanging tray to form the pusher tray assembly in accordance with an illustrative embodiment;

FIG. **8** is an illustration of a right front perspective view of the pusher tray assembly with the sliding tray fully extended;

FIG. **9** is an illustration of a right front from below perspective view of a pusher element of the pusher tray assembly in accordance with an illustrative embodiment;

FIG. **10** is a left rear from above perspective view of the pusher of the pusher tray assembly in accordance with an illustrative embodiment;

FIG. **11** is a left rear from below perspective view of the pusher of the pusher tray assembly in accordance with an illustrative embodiment;

FIG. **12** is an illustration of a view along cut line **12** in FIG. **3** of the pusher tray assembly in accordance with an illustrative embodiment;

FIG. **13** is an illustration of a view along cut line **13** in FIG. **3** of the pusher tray assembly in accordance with an illustrative embodiment;

FIG. **14** is an illustration of a view along line cut line **13** in FIG. **3** of the front plate and spring of the pusher tray assembly in accordance with an illustrative embodiment;

FIG. **15** is an illustration of a view along cut line **13** in FIG. **3** of the pusher tray assembly in an open position;

FIG. **16** is an illustration of a detail view of left lock with first left lock receptacle when pusher tray assembly is in an open position;

FIG. **17** is an illustration of a view along cut line **13** in FIG. **3** of the pusher tray assembly in a closed position; and

FIG. **18** is an illustration of a detail view of left lock engaging second left lock receptacle when pusher tray assembly is in the closed position.

DETAILED DESCRIPTION

In an advantageous embodiment, a pusher tray assembly is configured to allow replacement of a spring without a need to disassemble any or all of the pusher tray assembly.

In an advantageous embodiment, a pusher tray assembly is configured to hold a pusher plate to the rear while placing product between the pusher plate and the front of a display.

In an advantageous embodiment, a pusher tray assembly is configured to be adjustable to a number of widths to accept product of varying widths.

In an advantageous embodiment, a pusher tray assembly is configured with baffles that may be adjusted to prevent downward migration of cold air between pusher trays when a number of pusher tray assemblies are installed in a product display.

A number, as used herein with reference to an item, means one or more items.

FIG. **1** is an illustration of a block diagram of a pusher tray assembly in accordance with an illustrative embodiment. Product display **10** may be an area in which products are displayed for sale. In one embodiment, product display **10** may be product display **10** in FIG. **2**. Pusher tray assembly **100** may be configured to convey products from the back of pusher tray assembly **100** to the front of pusher tray assembly **100**. As depicted, pusher tray assembly **100** comprises hanging tray **200**, sliding tray **300**, and pusher **400**.

Hanging tray **200** has tray **210** removably engaged to product display **10** by bracket **260**. Hanging tray **200** has adjustable baffles **250** for preventing downward migration of refrigerated air. In an embodiment, left baffle **252** and right baffle **254** may be moveably engaged to tray **210**. Left baffle **252** may have left baffle tracks **253** that engage rivets **290** in tray **210**. Right baffle **254** may have right baffle tracks **255** that engage rivets **290** in tray **210**. Rivets **290** may be rivets **290** in FIG. **6**.

Hanging tray has center track **220**, left track **230**, and right track **240**. In an embodiment, center track **220**, left track **230**, and right track **240** may be longitudinal apertures in tray **210**. Center track **220** may be configured to receive fins of pusher **400** such as left fin **450** and right fin **460**. Left track **230** and right track **240** may be configured to receive locks of sliding tray **300** and fins of pusher **400** such as left lock **362** of sliding tray **300** and right lock **368** of sliding tray **300**. Sliding tray **300** may be slidingly engaged to hanging tray **200** by locks of sliding tray **300** such as left lock **362** and right lock **368**, and fins of pusher **400** such as left fin **450**, and right fin **460**, respectively.

Tray **210** of hanging tray **200** may have lock receptacles such as first left lock receptacle **232** of left track **230** and second left lock receptacle **234** of left track **230**. Tray **210** of hanging tray **200** may have first right lock receptacle **242** and second right lock receptacle **244** of right tray track **240**.

Sliding tray **300** may have dividers removably affixed such as left divider **330** and right divider **320**. Sliding tray may have wire track **310**. Wire track **310** may have a number of wires such as first wire **312**, second wire **314**, third wire **316**, and fourth wire **318** removably affixed to wire track **310** by end cap **340** and front plate **350**. Left divider **330** may have left divider wire **322** and left divider wall **338**. Right divider **320** may have right divider wire **322** and right divider wall **328**. In an advantageous embodiment, left divider **330** and right divider **320** may cooperate to be adjustable to a number of widths to accept product of varying sizes.

Pusher **400** engages tray **210** of hanging tray **200** by sliding engagement of left hook **444** with first wire **312** and right hook **448** with fourth wire **318**. Pusher **400** has compartment **470** formed by floor **420**, plate **410**, a portion of left fin **450** extending above floor **420** and a portion of right fin **460** extending above floor **420**. Spring **500** has coil **510**, band **520**, and hook **530**. Compartment **470** may contain coil **510**. Coil **510** may connected to aperture **374** in sliding tray by hook **530**. Left fin **450** and right fin **460** of pusher **400** may slidingly engage center track **220** of tray **210**. In an advantageous embodiment, spring **500** may be replaced without a need to disassemble any or all of pusher tray assembly **100** by placing coil **510** in compartment **470**, running band beneath pusher **400** and engaging hook **530** to aperture **374** of sliding tray **300**. In an advantageous embodiment, pusher plate **400** is held to a rear position, while placing product between pusher plate **410** and a front of display **10**, by left lock **362** engaging first left lock receptacle **232** and right **368** lock engaging first right lock receptacle **242** as further described at least in FIG. **15** through FIG. **18**.

Turning to FIG. **2**, a product display in accordance with an illustrative embodiment is depicted. Product display **10** may be product display **10** in FIG. **1**. In an embodiment, product display **10** may be configured to display a number of different products. In an embodiment, a product may be bags of salad presented for sale to consumers. In another embodiment, the number of different product may comprise a number of vegetables and garden products presented for sale to consumers. Persons skilled in the art recognize and take into account that a number of different products may be displayed in a product display such as product display **10**. Product display **10** may have roof **14** and base **16**. In one illustrative embodiment product display **10** may be open between roof **14** and base **16**. In another illustrative embodiment, product display **10** may be enclosed between roof **14** and base **16** (enclosure not shown). In a further illustrative embodiment, product display area **10** may be refrigerated. Product display **10** may be configured to receive a number of pusher tray assemblies such as pusher tray assembly **100**. Pusher tray assembly **100** engages trough **12** of product display **10** via bracket **260** such as bracket **260** in FIG. **1**, FIG. **7**, and FIG. **8**. A number of pusher tray assemblies that may be attached to product display **10** may be determined by dimensions of product display **10** and length of trough **12**.

Turning to FIG. **3** a pusher tray assembly **100** is depicted in accordance with an illustrative embodiment. Pusher tray assembly comprises hanging tray **200**, sliding tray **300** and pusher **400**. Hanging tray **200** may have baffles such as left baffle **352** and right baffle **254**. Sliding tray **300** may have dividers such as left divider **330** and right divider **320**. Pusher **400** may be movably engaged with sliding tray **300** and hanging tray **200**. Detail along cut line **12** may be seen in FIG. **12**. Detail along cut line **13** may be seen in FIG. **13** and FIG. **15** through FIG. **18**.

Turning to FIG. **4** the pusher tray assembly is depicted in accordance with an illustrative embodiment. Pusher tray assembly **100** may comprise left baffle **252** and right baffle **254** in extended positions to close a gap between one hanging tray **200** and another hanging tray **200** when multiple pusher tray assemblies are employed in a product display such as product display **10** in FIG. **2**. Closing a gap between one hanging tray **200** and another hanging tray **200** may form a continuous bottom for a row of pusher tray assemblies **100** in product display **10** to impede a migration of cold air downward in product display **10** when product display **10** is refrig-

erated. Left divider **330** and right divider **320** may be extended to close a gap between one hanging tray **200** and another hanging tray **200**. Left divider **330** and right divider **320** may be left divider **330** and right divider **320** in FIG. **1**, and FIG. **3** through FIG. **8**.

In an embodiment, right baffle **254** may rest on bottom **280** of hanging tray **200** and slide along bottom **280** guided by right baffle tracks **255**. Right baffle tracks may engage bottom **280** of hanging tray **200** by fasteners such as rivets **290** (see FIG. **6**). Right baffle **254** may be slidingly engaged to hanging tray **200** by any number of means, methods and/or configurations known to persons skilled in the art so that right baffle **254** may be extended outward from hanging tray **200** of pusher tray assembly **100** to close gaps that may be formed between one pusher tray assembly **100** and another pusher tray assembly **100** when a number of pusher tray assemblies are arrayed in a product display such as product display **10** in FIG. **2**. Left baffle **252** functions in like manner to the above described right baffle **254** sliding along bottom **280** guided by left baffle tracks **253** (see FIG. **6**). Left baffle **252** mirrors operation of right baffle **254** so that left baffle **252** may be extended outward from hanging tray assembly **200** of pusher tray assembly **100**.

Turning to FIG. **5**, an illustration of the pusher tray assembly is depicted in accordance with an illustrative embodiment. Pusher tray assembly **100** is shown with left divider **330** and right divider **320** extended. Right divider **320** may comprise right divider wire **322** with right divider wall **328** secured to right divider wire **322**. Right divider wire **322** may have a number of right divider first angles **324** and right divider second angles **326**. Right divider wall **328** may be formed in an "L" shape. Alternatively, right divider wall may be formed of a first part and a second part joined at approximately a 90 degree angle (not shown). In an embodiment, right divider wall is configured to be affixed to right divider wire **322** below right divider first angles **324** and to engage right divider second angles **326** as right divider wire **322** turns a direction of right divider wire **322** toward sliding tray assembly **300** for insertion into end channel **344** and front channel **376**.

Left divider **330** may comprise left divider wire **332** with left divider wall **338** secured to left divider wire **332**. Left divider wire **332** may have a number of left divider first angles **334** and left divider second angles **336**. Left divider wall **338** may be formed in an "L" shape. Alternatively, left divider wall may be formed as a first part and a second part joined at approximately a 90 degree angle (not shown). In an embodiment, left divider wall is configured to be affixed to left divider wire **332** below left divider first angles **334** and to engage left divider second angles **336** as left divider wire **322** turns a direction of left divider wire **322** toward sliding tray assembly **300** for insertion into end channel **344** and front channel **376**. Right divider **320** and left divider **330** are each separately moveable and adjustable in end channel **344** and front channel **376**. Right divider **320** and left divider **330** may be slidingly secured in end channel **344** by end cap **340**. Right divider **320** and left divider **330** may be slidingly secured in front channel **376** by front plate **350**.

Turning to FIG. **6**, an illustration of an exploded view of the pusher tray assembly is depicted in accordance with an illustrative embodiment. Pusher tray assembly **100** is shown with hanging tray **200** separated from sliding tray **300**. Left baffle **252** and right baffle **254** are shown extended outward from hanging tray **200**. Left divider **330** and right divider **320** are shown separated from sliding tray **300**. Wire track **310** comprises first wire **312**, second wire **314**, third wire **316**, and fourth wire **318**.

End cap **340** and front plate **350** secure first wire **312**, second wire **314**, third wire **316**, and fourth wire **318** to sliding tray. Sliding tray **300** may have one or more front plate apertures **352** for receiving front plate fins **354** of front plate **350**. Persons skilled in the art recognize and take into account that any number of front plate flange apertures **352** and any number of front plate flange fins **354** may be provided. In an embodiment, Front plate **350** may be formed from a translucent material such as, for example, clear plastic. Front plate **350** provides a stop for product packages pressed forward by pusher **400**. Pusher **400** may press product packages forward by force generated by coil **510** of spring **510** as coil **510** winds up band **510**. Fasteners **380** may affix front plate to sliding tray **300**. Fasteners **342** may affix end cap to sliding tray **300**.

Turning to FIG. **7**, an illustration of an exploded view depicts engagement of the sliding tray with the hanging tray to form the pusher tray assembly in accordance with an illustrative embodiment. Sliding tray **300** may be slidingly engaged with left tray track **230** of hanging tray **200** by passing left lock **362** through left opening **236** in left tray track **230** so that left post **364** may travel in left tray track **230** while left flange **366** prevents sliding tray **300** from rotating upward beyond left flange **366** when sliding tray **300** is moved from a first position at a rear of hanging tray **200** to a second position in a front of hanging tray **200**.

Likewise, sliding tray **300** may be slidingly engaged with right tray track **240** of hanging tray **200** by passing right lock **368** through right opening **246** in right tray track **240** so that right post **370** may travel in right tray track **240** while right flange **372** prevents sliding tray **300** from rotating upward beyond right flange **372** when sliding tray **300** is moved from the first position at a rear of hanging tray **200** to the second position at the front of hanging tray **200**.

Left flange **366** may engage second left lock receptacle **234** when sliding tray **300** is in a rear position at a rear of hanging tray **200** and may pass beyond first left lock receptacle **232** when sliding tray **300** is at a front position at a front of hanging tray **200**. Right flange **372** may engage second right lock receptacle **244** when sliding tray **300** is in the rear position at the rear of hanging tray **200** and may pass beyond first right lock receptacle **242** when sliding tray **300** is at the front position at a front of hanging tray **200**.

In an embodiment, left flange **366** and right flange **372** may be engaged by being pressed downward by second left lock receptacle **234** and second right lock receptacle **244**, respectively (see detail of left flange **366** and second left lock receptacle **234** in FIG. **18**). When sliding tray **300** is locked in the rear position left stop **382** engages left stop receptacle **383** and right stop **384** engages right stop receptacle **385**. Left stop **382** and right stop **384** may be disengaged from left stop receptacle **383** and right stop receptacle **395** respectively by lifting sliding tray upward.

When sliding tray **300** is in the front position, sliding tray is cantilevered out from hanging tray **200** and rotated slightly downward by a weight of sliding tray **300**. While rotated slightly downward, right flange **372** prevents rearward movement of sliding tray **300** beyond first right lock receptacle **242** (see detail in FIG. **16**). Likewise, when sliding tray **300** is cantilevered out from hanging tray **200** and rotated slightly downward by the weight of sliding tray **300**, left flange **366** prevents rearward movement of sliding tray **300** beyond first left lock receptacle **232**. A user may lift and rotate sliding tray **300** upward to allow passage of right flange **372** past first right lock receptacle **242** and left flange **366** past first left lock receptacle **232**.

Turning to FIG. **8**, an illustration of a right front perspective view of the pusher tray assembly with the sliding tray fully

extended is depicted. Sliding tray **300** may be pulled in a forward direction away from hanging tray **200**. Such movement of sliding tray **300** may be performed in order to load product (not shown) into sliding tray **300**. For example, pusher tray assembly **100** may be empty with no product inserted between pusher **400** and front plate **350**. Pusher **400** may be pulled forward by spring **500** (see FIG. **13** and FIG. **14**) until Pusher **400** is stopped by left fin **450** and right fin **460** contacting a front of edge **222** of center track **220** in a position in close proximity to front plate **350** as shown in FIG. **3** through FIG. **5**. FIGS. **15-16** further illustrate operation of left lock **362** and right lock **368** to lock sliding tray **300** in the position in close proximity to front plate **350**.

As sliding tray **300** is pulled forward and away from hanging tray **200**, left fin **450** and right fin **460** of pusher **400** press against front **222** of center tray track in hanging tray **200** so that pusher **400** remains in position relative to hanging tray **200** but moves to the rear of sliding tray **300** as sliding tray **300** is pulled forward. In the configuration depicted in FIG. **8**, pusher tray assembly **100** is ready to have product loaded into sliding tray **300** between pusher **400** and front plate **350**. In the extended position of FIG. **8**, sliding tray **300** may be locked by left lock **362** and right lock **368** engaging first left lock receptacle **232** and first right lock receptacle **242**, respectively (see FIG. **6**, FIG. **17**, and FIG. **18**).

Turning to FIG. **9**, an illustration of a right front from below perspective view of a pusher element of the pusher tray assembly is depicted in accordance with an illustrative embodiment. In this view front **412** of plate **410** may be seen with floor **420** extending rearward at approximately a 90 degree angle. Floor **420** may have floor bottom **440** from which left hook **444** and right hook **448** extend downward. Left hook **444** is shown having a curved portion that begins at floor **420** and extends downward to form a semi-circle from which a flat portion extends inwardly and approximately parallel to floor **420** forming a partially enclosed space into which a wire such as first wire **312** may be enclosed. Right hook **448** is shown having a curved portion that begins at floor **420** and extends downward to form a semi-circle from which a flat portion extends inwardly and approximately parallel to floor **420** forming a partially enclosed space into which a wire such as fourth wire **318** may be enclosed.

Floor **420** may have left fin **450** and right fin **460** extending downward at approximately 90 degree angle to floor bottom **440**. Left fin **450** may have left fin flange **452** extending outwardly from left fin **450** at approximately an 83 degree angle. Right fin **460** may have right fin flange **462** extending outwardly from right fin **460** at approximately an 83 degree angle. Sliding tray **300** may be moveably connected to hanging tray **200** by left fin **450** and right fin **460**. In an embodiment, a user may manipulate left fin **450** and right fin **460** in order to insert left fin **450** and right fin **460** into center track **220** of hanging tray **200**. In an embodiment, left fin **450** and right fin **460** may be made from a material having some plasticity or flexibility and may be bent slightly for insertion through center track **220**. In another embodiment, left fin **450** and right fin **460** may be manipulated without flexing left fin **450** or right fin **460**. Once right fin flange **462** and left fin flange **452** are positioned below tray **210** of hanging tray **200**, pusher **400** may travel guided by center track **220**. Movement of pusher **400** out of center track **200** is prevented by right fin flange **462** and left fin flange **452** and sliding tray **300** is moveably connected to hanging tray **200**. Once left fin **450** and right fin **460** are moveably engaged with tray **210** of hanging tray **200**, left hook **444** may be engaged to a wire such as first wire **312** and right hook **448** may be engaged to a wire such as fourth wire **318**. In an embodiment, engagement of left hook **444** and right hook **448** may be performed by manually flexing a wire such a first wire **312** or fourth wire **318** to allow engagement of left hook **444** or right hook **448**. In an embodiment, an 83 degree upward angle from vertical of right fin flange **462** and left fin flange **452** facilitates manipulation of right fin **460** and left fin **450** through center track **220** of tray **210**. In an embodiment, an 83 degree upward angle from vertical of right fin flange **462** and left fin flange **452** provides additional resistance to pusher **400** being pulled out of center track **220**. Persons skilled in the art recognize and take into account that a number of angles may be used in conjunction with right fin flange **462** and left fin flange **452**.

Turning to FIG. **10**, a left rear from above perspective view of the pusher of the pusher tray assembly is depicted in accordance with an illustrative embodiment. Pusher **400** has back **414** of plate **410**. Floor **420** has floor top **430**. Left brace **480** extends upward from floor top **430** at an approximate 90 degree angle and outward from back **414** at an approximate 90 degree angle. Likewise, right brace **490** extends upward from floor top **430** at an approximate 90 degree angle and outward from back **414** at an approximate 90 degree angle. Left brace **480** and right brace **490** may provide strength and rigidity to plate **410** when front **412** of plate **410** is driving product packages forward along sliding tray **300** (not shown). Left fin **450** and right fin **460** extend upward from floor top **420** at approximately a 90 degree angle to form compartment **470** in pusher **400**. Compartment **470** comprises an area formed by back **412** of plate **410**, floor center section **432** (see FIG. **13**), left fin **450** and right fin **460**.

Turning to FIG. **11**, a left rear from below perspective view of the pusher of the pusher tray assembly in accordance with an illustrative embodiment is depicted. Left hook **448** and right hook **444** may be seen from a rear view. Left flange **462** and right flange **452** may be seen from a rear view.

Turning to FIG. **12**, an illustration of a view along cut line **12** in FIG. **3** of the pusher tray assembly in accordance with an illustrative embodiment is depicted. Pusher plate **400** is shown engaging first wire **312** with left hook **444** and fourth wire **318** with right hook **448**. Pusher plate **400** rests on and slides along second wire **314** and third wire **316**. Left fin **450** and right fin **460** of pusher **400** extend downward into center tray track **220** of hanging tray **200**. Left fin flange **452** and right fin flange **462** of pusher **400** hold sliding tray assembly to tray **210** of hanging tray **200** when left fin flange **452** and right fin flange **462** contact tray **210**. Likewise, left flange **366** of left lock **362** and right flange **372** of right lock **368** hold sliding tray assembly to tray **210** of hanging tray **200** when base left flange **366** and base right flange **372** contact tray **210** of hanging tray **200**.

Turning to FIG. **13**, an illustration of a view along cut line **13** in FIG. **3** of the pusher tray assembly in accordance with an illustrative embodiment is depicted. Spring **500** is shown with coil **510** resting against back **414** of plate **410** of pusher **400**. Hook **530** engages post **390** of sliding tray **300**. Front plate **350** is configured to allow passage of hook **530** around post so that spring **500** may be removed and replaced without any disassembly of any portions of pusher tray assembly **100**. Spring **500** may be removed by disengaging hook **530** from post **390**, running band **520** under pusher **400**, and removing coil **510** from compartment **470**. Spring **500** may be installed by engaging hook **530**, running band under pusher **400**, and inserting coil **510** in compartment **470**.

Turning to FIG. **14**, an illustration of a view along line cut line **13** in FIG. **3** of the front plate and spring of the pusher tray assembly in accordance with an illustrative embodiment is depicted. Hook **530** of spring **500** engages post **390**. In the view of FIG. **14**, spring is engaged but is not yet positioned in

compartment **470** (see FIG. **9** through FIG. **11**) for engagement with back **414** of plate **410** of pusher **400**. Band **520** may be extended and passed under pusher **400** so that coil **512** may be positioned.

Turning to FIG. **15**, an illustration of a view along cut line **13** in FIG. **3** of the pusher tray assembly in an open position is depicted. The position of sliding tray **300** to hanging tray **200** in FIG. **15** corresponds to the position of sliding tray **300** to hanging tray **200** in FIG. **8**. Left lock **362** engages first left lock receptacle **232**. In an embodiment, when sliding tray **200** is locked by left lock **362** and right lock **368** engaging first left lock receptacle **232** and first right lock receptacle **242**, respectively, sliding tray **300** hangs at an angle relative to hanging tray **200**. The angle is formed by left post **364** of left lock **362** and right post **370** of right lock **368**, respectively. Further, a weight of sliding tray **300** causes sliding tray **300** to rotate downward to a cantilevered position over hanging tray **200** and may be stopped at least in part by left flange **366** of left lock **362** and right flange **372** of right lock **368**. A user may unlock sliding tray **200** from the position described above by rotating sliding tray **200** upward to a plane parallel to or above a plane of hanging tray **200** and pushing sliding tray **300** toward bracket **260** of hanging tray **200**.

Turning to FIG. **16**, an illustration of a detail view of left lock with first left lock receptacle when pusher tray assembly is in an open position is depicted. Left lock **362** may be seen engaged with left lock receptacle **232**. When sliding tray **200** is rotated upward, left flange **366** will move downward on left post to a position below left lock receptacle **232**. Once left flange **366** moves to a position below left lock receptacle **232**, sliding tray **300** may be moved toward bracket **260** of hanging tray **200**.

Turning to FIG. **17**, an illustration of a view along cut line **13** in FIG. **3** of the pusher tray assembly in a closed position is depicted. In an embodiment depicted in FIG. **17**, sliding tray **300** has been moved back toward bracket **260** of hanging tray **200** until left lock **362** engages second left lock receptacle **234** and right lock **368** (see FIG. **7**) engages second right lock receptacle **244** (see FIG. **7**). Right lock **368** engages second right lock receptacle **244** in a similar manner to an engagement of left lock **362** and second left lock receptacle **234**.

FIG. **18** is an illustration of a detail view of left lock engaging second left lock receptacle when pusher tray assembly is in the closed position. Left flange **366** at end of left post **364** of left lock **362** is pressed downward by second left lock receptacle keeping sliding tray **200** in a plane substantially parallel to a plane of hanging tray **300**. A user may unlock sliding tray **300** from hanging tray **200** by lifting up and rotating sliding tray **300** in substantially vertical direction. Lifting up and rotating sliding tray **300** in a substantially vertical direction releases left flange **366** from second left lock receptacle. Likewise lifting up and rotating sliding tray **300** in substantially vertical direction releases right lock **368** from second right lock receptacle **244** (see FIG. **7**). Movement of right lock **368** to release from second right lock receptacle **244**, mirrors the movement of left lock **362** to release from second left lock receptacle **234**.

In an illustrative embodiment, a pusher tray assembly comprises a hanging tray and a sliding tray having a wire track, the sliding tray moveably connected to the hanging tray by fins of a pusher, the pusher slidingly engaged to the wire track for movement between a first position and a second position.

In an illustrative embodiment, a first hook may extend from a bottom of the pusher and slidingly engage a first wire in the wire track. A second hook may extend from the bottom of the pusher and slidingly engage a second wire in the wire track.

In an illustrative embodiment, the wire track may comprise a number of wires, each wire having a flexibility to allow a lateral movement for engagement with the first hook and the second hook.

In an illustrative embodiment, at least one fin of the pusher may slidingly engage with a center track in the hanging tray.

In an illustrative embodiment, a left fin may extend downward from a bottom of the pusher and slidingly engage with a first side of a center tray track in the hanging tray.

In an illustrative embodiment, a right fin may extend downward from the bottom of the pusher and slidingly engage with a second side of the center tray track in the hanging tray.

In an illustrative embodiment, each wire may have a first end removably engaged to a front end of the sliding tray by a front plate and a second end removably engaged to a rear end of the sliding tray by an end cap.

In an illustrative embodiment, one or more dividers may be removably engaged to the sliding tray.

In an illustrative embodiment, a compartment may be formed by a back of a plate, a right brace, a left brace, and a center section of a floor, the compartment configured to receive a coil of the spring and to pass a running end of the spring under the center section of the floor.

In an illustrative embodiment, the spring may further comprise a spring hook removably engaged to a spring aperture in a base of the sliding tray.

In an illustrative embodiment, one or more front plate fins may engage one or more front plate apertures in a base of the sliding tray.

In an illustrative embodiment, a lock may be on a bottom of the sliding tray and a lock aperture may be in the hanging tray for receiving the lock when the sliding tray has moved into a locking position.

In an illustrative embodiment, a left baffle and a right baffle may each be slidingly engaged to the hanging tray and moveable from a first position to a second position that extends a longitudinal footprint of the hanging tray to each side.

In an illustrative embodiment, the second position of the left baffle and the right baffle may impede a flow of air in a vertical direction when the hanging tray is installed in a product display.

In an illustrative embodiment, a bracket at a rear end of the hanging tray may be configured to removably engage a product display. A product display may include a wall of a refrigeration unit.

In an illustrative embodiment, a coil of the spring may reside in a compartment of the pusher and a spring hook of the spring may removably engage a spring aperture in a base of the sliding tray.

In an illustrative embodiment, a wire track in the sliding tray may have a plurality of wires, each wire having a first end removably engaged to a front end of the sliding tray by a front plate and a second end removably engaged to a rear end of the sliding tray by an end cap.

In an illustrative embodiment, a pusher may be slidingly engaged to the sliding tray and to the hanging tray for movement between a rear of the sliding tray and a front of the sliding tray and for slidingly engaging the sliding tray to the hanging tray.

In an illustrative embodiment, a left hook may extend from a bottom of the pusher and slidingly engage a first wire in the wire track. A right hook may extend from the bottom of the pusher and slidingly engage a second wire in the wire track. A left fin may extend downward from a bottom of the pusher and slidingly engage a center tray track in the hanging tray. A right fin may extend downward from the bottom of the pusher and engage the center tray track in the hanging tray.

In an illustrative embodiment, a back of a plate of the pusher, a right brace of the pusher, a left brace of the pusher, and a center section of a floor of the pusher may form a compartment configured to receive a coil of the spring and to pass a band of the spring under the center section of the floor. The running end may be a band located between a hook and a coil.

In an illustrative embodiment, the spring may further comprises a spring hook removably engaged to a spring aperture in a base of the sliding tray. In an embodiment, the spring hook may be removably engaged by a hook of the spring engaging a post in the sliding tray. In an embodiment, the front plate may provide an access to the post so that the spring hook may be engaged without removing the front plate.

In an illustrative embodiment, one or more front plate fins may engage one or more front plate apertures in a base of the sliding tray.

In an illustrative embodiment, a lock aperture in the hanging tray may receive the lock when the sliding tray has moved into a locking position.

In an illustrative embodiment, a left baffle and a right baffle, each slidingly engaged to the hanging tray and moveable from a first position to a second position may extend a longitudinal footprint of the hanging tray to each side.

In an illustrative embodiment, a second position of the left baffle and the right baffle may impede a flow of air in a vertical direction when the hanging tray is installed in a display unit.

In an illustrative embodiment, a bracket at a rear end of the hanging tray may be configured to removably engage a product display. In an embodiment, the bracket may be configured to engage a trough in the product display.

In an illustrative embodiment, a pusher tray assembly may be constructed to secure a sliding try to a hanging tray by engaging hooks on a pusher with wires on the sliding tray and by slidingly engaging fins on the pusher with a center track on the hanging tray so that flanges on the fins prevent separation of the sliding tray from the hanging tray.

In an illustrative embodiment, movable dividers may extend a bottom of the hanging tray by moving baffles outward from a bottom of the hanging tray, the baffles slidingly engaged to the bottom.

When one component is "associated" with another component, the association is a physical association in these depicted examples. For example, a first component, tray **118**, may be considered to be associated with a second component, base **120**, by being secured to the second component, bonded to the second component, mounted to the second component, welded to the second component, fastened to the second component, and/or connected to the second component in some other suitable manner. The first component also may be connected to the second component using a third component. The first component may also be considered to be associated with the second component by being formed as part of and/or an extension of the second component.

Thus, the illustrative embodiments provide an apparatus for storing products. Further, the illustrative embodiments also may be used to maintain the presence of products at the front of a product display.

The illustrative embodiments provide an apparatus that allows for a reduction in the amount of jostling of shelved products. The illustrative embodiments also provide an apparatus that allows for greater flexibility in placement of dividers. Additionally, the illustrative embodiments provide an apparatus which provides greater structural support. The illustrative embodiments further provide an apparatus that reduces the stress on anchoring points.

The description of the different illustrative embodiments has been presented for purposes of illustration and description, and is not intended to be exhaustive or limited to the embodiments in the form disclosed. Many modifications and variations will be apparent to those of ordinary skill in the art. Further, different illustrative embodiments may provide different features as compared to other illustrative embodiments. The embodiment or embodiments selected are chosen and described in order to best explain the principles of the embodiments, the practical application, and to enable others of ordinary skill in the art to understand the disclosure for various embodiments with various modifications as are suited to the particular use contemplated.

What is claimed is:

1. A pusher tray assembly comprising:

a hanging tray having a first tray track and a second tray track, a first opening in the first tray track and a second opening in the second tray track;

a sliding tray having a wire track, a first lock having a first post and a first flange, and a second lock having a second post and a second flange, the first lock configured to pass through the first opening and the second lock configured to pass through the second opening, the first post configured to travel in the first tray track and the second post configured to travel in the second tray track such that the sliding tray is moveably connected to the hanging tray, the first flange and the second flange preventing the sliding tray from moving away from the hanging tray when the sliding tray is moved from a first position at a rear of the hanging tray to a second position in a front of the hanging tray; and

a pusher slidingly engaged to the wire track for movement between a first position and a second position, the pusher having at least one fin slidingly engaged with a center track in the hanging tray.

2. The pusher tray assembly of claim **1**, further comprising:

a first hook extending from a bottom of the pusher slidingly engaged to a first wire in the wire track, and a second hook extending from the bottom of the pusher slidingly engaged to a second wire in the wire track.

3. The pusher tray assembly of claim **2**, wherein the wire track comprises a number of wires, each wire having a flexibility to allow a lateral movement for engagement with the first hook and the second hook.

4. The pusher tray assembly of claim **1**, said at least one fin further comprising:

a left fin extending downward from a bottom of the pusher slidingly engaged with a first side of a center tray track in the hanging tray;

a right fin extending downward from the bottom of the pusher slidingly engaged with a second side of the center tray track in the hanging tray.

5. The pusher tray assembly of claim **3** wherein each wire has a first end removably engaged to a front end of the sliding tray by a front plate and a second end removably engaged to a rear end of the sliding tray by an end cap.

6. The pusher tray assembly of claim **1**, wherein one or more dividers are removably engaged to the sliding tray.

7. The pusher tray assembly of claim **1** wherein the pusher further comprises:

a compartment formed by a back of a plate, a right brace, a left brace, and a center section of a floor, the compartment configured to receive a coil of a spring and to pass a running end of the spring under the center section of the floor.

8. The pusher tray assembly of claim 1, further comprising a spring, wherein the spring further comprises a spring hook removably engaged to a spring aperture in a base of the sliding tray.

9. The pusher tray assembly of claim 1, further comprising: a front plate having one or more front plate fins engaged with one or more front plate apertures in a base of the sliding tray.

10. The pusher tray assembly of claim 1, further comprising:

a left baffle and a right baffle, each slidingly engaged to the hanging tray and moveable from a first position to a second position that extends a longitudinal footprint of the hanging tray to each side.

11. The pusher tray assembly of claim 10, wherein the second position of the left baffle and the right baffle impedes a flow of air in a vertical direction when the hanging tray is installed in a display unit.

12. The pusher tray assembly of claim 1 further comprising:

a bracket at a rear end of the hanging tray configured to removably engage a wall of a refrigeration unit.

13. The pusher tray assembly of claim 1, further comprising a spring, wherein a coil of the spring resides in a compartment of the pusher and a spring hook of the spring removably engages a spring aperture in a base of the sliding tray.

14. A pusher tray assembly comprising:

a hanging tray having a first tray track and a second tray track, a first opening in the first tray track and a second opening in the second tray track;

a sliding tray having a first lock and a second lock, the first lock comprising a first post and a first flange, and the second lock comprising a second post and a second flange, the first lock configured to pass through the first opening and the second lock configured to pass through the second opening, the first post configured to travel in the first tray track and the second post configured to travel in the second tray track such that the sliding tray is moveably connected to the hanging tray, the first flange and the second flange preventing the sliding tray from moving away from the hanging tray when the sliding tray is moved from a first position at a rear of the hanging tray to a second position in a front of the hanging tray;

a wire track in the sliding tray, the wire track having a plurality of wires, each wire having a first end removably engaged to a front end of the sliding tray by a front plate and a second end removably engaged to a rear end of the sliding tray by an end cap;

a pusher slidingly engaged to the sliding tray and to the hanging tray for movement between a rear of the sliding tray and a front of the sliding tray and for slidingly engaging the sliding tray to the hanging tray;

a left hook extending from a bottom of the pusher that slidingly engages a first wire in the wire track;

a right hook extending from the bottom of the pusher that slidingly engages a second wire in the wire track;

a left fin extending downward from a bottom of the pusher that slidingly engages a center tray track in the hanging tray;

a right fin extending downward from the bottom of the pusher that slidingly engages the center tray track in the hanging tray; and

a left baffle and a right baffle, each slidingly engaged to the hanging tray and moveable from a first position to a second position that extends a longitudinal footprint of the hanging tray to each side, wherein the second position of the left baffle and the right baffle impedes a flow of air in a vertical direction when the hanging tray is installed in a display unit.

15. The pusher tray assembly of claim 14, further comprising:

the pusher having a plate with a back, a right brace, a left brace, and of a floor with a center section; and

a compartment formed by the back of the plate, the right brace, the left brace, and the center section of the floor, the compartment configured to receive a coil of a spring and to pass a running end of the spring under the center section of the floor; and

a front plate having one or more front plate fins engaged with one or more front plate apertures in a base of the sliding tray;

wherein the spring further comprises a spring hook removably engaged to a spring aperture in the base of the sliding tray.

16. The pusher tray assembly of claim 14 further comprising:

a bracket at a rear end of the hanging tray configured to removably engage a product display.

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